IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE: The application of Dominick Amari

TITLE OF THE INVENTION

Artificial Island And Method Of Construction Thereof

CROSS REFERENCE TO RELATED APPLICATIONS

Not Applicable

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH AND DEVELOPMENT

Not Applicable

BACKGROUND OF THE INVENTION

Field of the invention

This invention relates to a method of construction of an artificial island.

BRIEF DESCRIPTION OF THE INVENTION

Along the coastlines of the United States and other countries, barrier islands protect the mainland and wetlands from damage caused by storms. In locations where no barrier islands exist, shore erosion is a serious problem. To reduce the impact of storms on the shoreline wetlands, the instant invention is a method of making artificial barrier islands. The method consists of driving a series of piles in the shape of the island, attaching a number of wire mesh sections, to form a fence around the perimeter of the piles, connecting the tops of the piles with cables, and then filling the formed enclosure with rock, reworked concrete or suitable fill material. Once the fill material has reached the water surface, it can be covered with suitable soil and vegetation to

create the island. When complete, the piles and mesh are hidden below the surface and the formed island takes on a natural appearance.

In this way, the artificial island acts as a barrier to storms, thus protecting the shoreline wetlands. Moreover, the artificial island creates an ideal habitat for birds, fish and amphibians. It is estimated that one island protects 10 times the amount of shoreline that lies behind it in certain applications.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a side sectional view of he invention.

Figure 2 is a diagrammatic plan view of the invention showing the plan of cross ties.

Figure 3 is a side view of a portion of a typical island fence section.

Figure 4 is a detail side view of a typical pile.

Figure 5 is a plan view of a typical pile.

Figure 6 is a perspective view of a typical pile.

Figure 7 is a plan environmental view of a typical shoreline with wetlands, showing the placement of the invention is open water in from of the shore.

Figure 8 is an environmental view of a series of islands formed using the invention.

Figure 9 is a side detail view of an alternative embodiment, in which the invention is used to form an artificial reef.

DETAILED DESCRIPTION OF THE INVENTION

Referring now to fig. 1, a side view of the island is presented showing the interior and exterior structure. Figure 1 shows an assembled island **1**. The island has a number of piles **2** formed about a perimeter; see also below. The piles are driven into the sub bottom **100**. A mesh fence **3** is attached to the piles, as discussed below. The fence extends from below the muckline (when present) **101** to the top surface of the water **102**, (see figure 3). In figure 1, the mesh is only partially shown to allow the inner components to be shown. The combination of piles and fencing forms a "corral" structure (see fig. 2) to hold the island components in place.

The island components are placed within the "corral" structure. Extending from the muckline to a point near the surface of the water is a mass of riprap material 5. Above the riprap is a layer of geotextile fabric **16** that is used to retain the cover soil **6.**

Above the geotextile fabric **16** is a layer of cover fill **6**. The cover fill extends above the water line for a specific distance to form the portion of the island that is visible. This cover may then be planted with indigenous vegetation **7** to prevent erosion and to create habitat for wildlife (birds, reptiles and amphibians).

Figure 2 is a plan view of the basic "corral" structure. Note that the piles are tied together by cables (stainless steel cables for marine environment) **8,** which are discussed below. The cables **8** extend around the perimeter of the island **1** as shown and they run across the center of the island to anchor opposite pilings as shown. The details of the cables and their connections are discussed below.

Figure 3 is a side detail view showing three piles and two mesh sections. The piles **2** can be made of steel, wood or concrete, depending on the location and site-specific design considerations. Although all of the piles may be made of the same material, it is also possible to alternate piles of different materials. For example, concrete piles can be alternated with wooden piles or steel point bearing piles. The mesh fence **3** is made of a wire mesh. In the preferred embodiment, the fence **3** is made of stainless steel welded wire mesh that is reinforced with stainless steel cables **8** for marine environment. Wire mesh of 8 gauge is preferred but mesh strength is calculated for site-specific environments. The mesh is attached to the piles using a clip system that is described below.

Figure 4 is a detail side view of a typical pile **3**. A stainless steel "T"-rail 10 is installed in two sides (see fig. 5). The "T"-rail **10** is used to secure the wire mesh **3** with stainless steel clips **11** (see also fig. 6). A header **12** is formed onto the pile. The header is used to secure clamps for the stainless steel cable ties **5**.

Figure 5 is a plan view of a typical pile **2**. Figure 6 is a perspective view of a typical pile. In these views, the stainless steel "T"-rails **10** are clearly shown. The wire mesh **3** is shown extending out from the pile laterally. Behind the wire mesh is a layer of riprap material **5**. Note the shackles **15** that are connected to the header **12**. Note also the stainless steel cables **5** that extend out from the shackles to connect to other piles (see fig. 2). Note also that fig. 6 shows the stainless steel clips **11** that secure the mesh **3** to the piles **2**.

As discussed below, the artificial islands are intended to be positioned in water in front of or adjacent to wetland areas. Figure 7 is a plan environmental view of a typical shoreline **110** with wetlands **111**, showing the placement of the invention **1** is open water **112** in front of the shore. The islands are arraigned in a line to act as shoreline protection and a barrier for storm surges. The water depth can vary from 5 feet to a maximum of about 45 feet. The minimum water depth is limited by the draft of the barges needed for the construction of the island.

Figure 8 is an environmental view of a series of islands formed using the invention. Here three islands **1** are shown in water **112**. In this way, a row of several islands can be built to minimize damage from storms.

A typical island is formed as follows:

Typically, all work is done from a barge. First, a set of piles is positioned in the shape of the island. The piles can be made of concrete, steel or wood, using well know techniques. The shape of the island is dependent on a number of factors and is always site-specific. Factors such as water depths and currents (speed and direction) as well as wind velocity and storm surge are site specific and will determine the purpose of the island (such as protecting eroding shoreline or wetlands). The environmental processes shall determine the exact shape of the island. These factors are commonly used to design structures such as bridges and other in-water structures and their calculations are well within the scope of ordinary skill in the art.

Once the piles are positioned, they are driven into the bottom at a sufficient depth to meet the design conditions. The length of the piles depends on the depth of the water and subsurface conditions. In the preferred embodiment, the maximum water depth is 45 feet. However, the island can be built in shallower water as needed. Note also that the depth of the water determines the distance of the island from the mainland. The piles are driven so that their tops are at the water surface level (usually measured at low tide for marine environments). Spacing of the piles also depends on the design factors. For example, a spacing of 30 feet between piles is a typical measure. However, this spacing will change with the conditions and is, again, entirely site-specific.

The size of the island depends on the intended use and site-specific conditions. The minimum diameter of the island is calculated, but is also dependent upon the water depth. Typically, the diameter of the island shall be three times the depth of the water. Thus, for a 30-foot water depth, the island diameter should be considered to be at least 90 feet. Using the rule above provides an adequate base to make a stable island.

Once the piles are set, wire mesh is attached to the piles. This mesh runs around the perimeter, forming a corral-like structure. In the preferred embodiment, the wire mesh is stainless steel welded wire mesh, but mesh made of other materials can be used. The wire mesh is pushed down into the bottom, to the level of the sub bottom. It then extends up to the top of the piles, as shown.

Once the "corral" is formed, the tops of the piles are tied together using cables that form tiebacks. The tiebacks are shown in figs. 2 and 5. In Figure 2, a top view of the corral structure is shown. Note how the tiebacks run to piles that are positioned opposite of each other. The tiebacks hold the piles in a vertical position when the island is formed. They keep the piles from splaying out as the "corral" is filled.

Once the "corral" structure is complete, it is filled with riprap material (rock is preferred). The riprap material is delivered on barges. Typically, riprap material is added until it is almost to the surface of the water. The "rock" is then covered with a geotextile mat that extends up to the top of the screen mesh. This matting retains the cover soil in the corral and provides a base for natural vegetation. At that point, soils can be added to build up the island above the surface of the water as desired. Alterations and design considerations for marine environments shall include tidal actions, storm surge and wave frequency.

Finally, the soil is planted with vegetation suitable for the location.

Figure 9 shows another embodiment of the invention. Here, the piles **20** are set to a height below the surface of the water **120**. For example, the tops of the piles might be 8 feet below the surface at low tide. The "corral" is formed in the same way as discussed above using the wire mesh **21**. "Rock" **22** is placed in the structure to the top of the piles **20**, however no top cover is used. This structure forms an artificial reef, which acts as a breakwater

An example of a typical construction follows: To make an island in approximately 30-35 feet of water, fifteen of 70 foot concrete "I" piles are used (note: pile depth is site specific). The piles are driven into the bottom until they extend up from the bottom 30-35 feet, until that are at the level of the low tide. The piles are spaced approximately 30 feet apart forming a shell with a perimeter of approximately 440 feet (this configuration is shown in figure 2). Next, 8 ga. stainless steel welded wire mesh is attached to the piles. The mesh is approximately 35-40 feet in height. The mesh is pushed down into the muck layer. A series of stainless steel cables is suspended between the piles in a pattern as shown in figure 2. Once the cables are secure, barges loaded with riprap material are positioned and the material is dumped into the enclosure. The riprap is laid to a point approximately 1 foot above the water surface. The rock is then covered with a geotextile mat that extends above the top of the screen mesh. Then quantities of fill dirt are added as cover material until the cover material extends to design height, (in this case approximately 5 feet above the high tide mark). Finally, a number of indigenous plants and trees are added to the island to form a vegetative cover to prevent erosion.

The present disclosure should not be construed in any limited sense other than that limited by the scope of the claims having regard to the teachings herein and the prior art being apparent with the preferred form of the invention disclosed herein and which reveals details of structure of a preferred form necessary for a better

understanding of the invention and may be subject to change by skilled persons within the scope of the invention without departing from the concept thereof.